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ABSTRACT

This paper makes the case that the standards-based reform movement is too limited an approach to rely on in educational reform, and that there is a set of hard facts that must be faced if there is to be any significant improvement in student achievement. These facts are the attitudes, practices, and conditions that are so embedded in culture and personal experience that they escape serious attention. Without an understanding of the preconditions that have an impact on improvement in academic rigor and student achievement, there is little basis for serious consideration of new ways and means of raising educational success. Tests are being used to hold students and schools accountable for standards before much needed teaching capacity is built. In addition, tests are not aligned to the standards, and tests are not aligned to the curriculum. The standards-based reform movement can only succeed if policymakers and educators pay attention to the larger societal context and the environment in which change is to be implemented. Issues that must be considered in this context include student behavior, weak signals that academic achievement is important, the acknowledgement of the importance of sources of learning outside the school, and the appropriate use of educational technology. It is not appropriate to lessen efforts to implement the standards-based reform agenda, but this alone will not be enough for significant improvement. (SLD)

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A POLICY INFORMATION PERSPECTIVE

Facing the Hard Facts in Education Reform

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Preface

As I write this preface, the Congress is moving towards approval of the Elementary and Secondary Education Act, which will be the primary mechanism for charting federal involvement in our nation's schools. Among the major issues being debated is the role of increased student testing as a tool for ensuring educational quality. As an assessment organization, Educational Testing Service has a vested interest in how these matters play out. Indeed, as an organization that has at the core of its mission serving as the leader in educational assessment, we try to do more than simply watch policies unfold — we try to provide useful information to policymakers that can help them in their deliberations.

We do this by supporting the kind of policy work that is exemplified in this report by Paul Barton. We don't undertake this work to sell tests. Rather, we do it because we take seriously our role in opening up educational opportunity for all. Policy research that illuminates conditions, challenges conventional wisdom, unpacks the complexity of issues, and provides salient and credible information on politically charged matters can play a significant role in helping policymakers make informed decisions.

Facing the Hard Facts is a synthesis of a decade of work and illuminates some very critical issues involved in transforming American education, issues that are not at the center of the current educational debate and developing legislation. If we pay attention to Barton's claims, we will make progress on issues that open up opportunities for all students. If we only focus on the test scores, and not on the alignment of educational policies and practices that influence those scores, we will do nothing more than blame those who have not benefited from the system. If there isn't sufficient order in schools and classrooms to ensure a reasonable learning environment, then it matters not what curricula are followed or what textbooks are purchased. If we don't, as a society, begin to value academic achievement more consistently and encourage practices that develop social capital for all, then we will continue to expand the divide of the haves and have-nots. Finally, if we do not take advantage of the power of technology in all schools, then we will have wasted enormous financial resources as we erroneously equate access to hardware with access to ideas.

Barton raises a number of key points, but even these are not an exhaustive list. School finance and teacher quality are but two additional issues that will continue to challenge our values and assumptions about the importance of education, the nature of social responsibility and accountability, and fairness.

I hope that you as readers will find this report as provocative as I do. I also encourage you to visit our website at www.ets.org/research/pic, where you can download additional Policy Information Center reports.

Drew H. Gitomer
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Carla Cooper provided desktop publishing, Marie Collins was the editor, Marita Gray was the cover designer, and Trina Hess was the production manager.

Introduction

Considerable momentum has been gained in education reform under the umbrella of standards-based reform.

There is general agreement that this includes, at a minimum, setting standards for what content should be taught and what performance students should be expected to demonstrate, and for creating assessments aligned to those standards. The approach seems inherently logical, and a general consensus has developed that this is the way to proceed. I am part of that consensus. However, I also believe that the formulation is incomplete, and that implementation in many places (but by no means all) has strayed from the path.

I argue that this standards-based reform movement is too limited an approach to rely on, and that there is a set of hard facts we must face if we are to see any really significant improvement in student achievement. The nation has set ambitious goals, and the effort to achieve them must be equally ambitious. The analysis presented here does not address ways to restructure schools or schooling, though this important debate, subject as it is to polarization, should continue. It is my belief that the matters discussed in this report, while they have yet to take center stage, are mostly within the broad center of viewpoints. My intent is to bring information and perspectives to bear that have not yet been given serious attention.

Of course, while standards-based reform is the driving force today, with a focus on defining and measuring outcomes, policy makers and educators do not all view the current reform movement as standards-based reform and nothing else. There are efforts in various places and levels of intensity that reflect a broader view of education reform. But school standards, accountability, and testing have occupied center stage.

It is not surprising that basic change in institutions is difficult as societies and cultures strive to continue to exist, and to recreate themselves. Education is very much engaged in passing on the civilization to succeeding generations, and formal schooling is part of that process. As a result, we see a demand for teaching values we fear the younger generation has lost or may lose. We see parents looking at what goes on in schools and comparing their children's experiences to the experiences they had; they are often suspicious of large changes. Due to a myriad of conflicting cultural attitudes, we see considerable toleration of disorder in the schoolroom, although common sense tells us it harms learning; boys and girls will be boys and girls, won't they? And new uniforms for the marching band may well get more support than making sure every student has a textbook.

If we truly want succeeding generations to learn significantly more than past ones, we must, as a society, in a sense, pull ourselves up by our bootstraps. Knowing this, we examine our shoelaces and other seemingly mundane matters, such as cutting classes, getting employers to ask for school transcripts, and

reading to young children in the home. And then there are those computers that, so far, have not realized their promise. At any one time, a few proposals and issues dominate the political and professional discussion. But as the buzz goes on, there remain those attitudes, practices, and conditions that are so embedded in our culture and personal experience that they escape our serious attention. These are facts that must be faced.

This report does not recommend a lot of specific policy prescriptions. It is intended to provide the understanding necessary to formulate those prescriptions. Without an understanding of the many preconditions that impact significant improvement in academic rigor and student achievement, there is little basis for serious consideration of new ways and new means of raising educational success.

THE TE[illegible]ST IS NOT THE TREATMENT

People who have committed themselves to the standards-based reform approach recognize that standardized testing is a very important part of that appr[illegible]ach.

They also recognize the role [illegible]esting should play in our total approach [illegible]to education reform. It turns out, though, [illegible]hat in implementing reform, many states [illegible]ave somehow come to view the test itself as [illegible]he treatment, rather than as a way to mo[illegible]nitor whether reform measures are actual[illegible]y producing results. At the same time, tests a[illegible]re increasingly being used for high-stakes pu[illegible]rposes — the means of holding schools, [illegible]eachers, and students accountable. All th[illegible]is is creating a backlash in many states [illegible]hat is driven by students, parents, and th[illegible]e public, and which is threatening forward p[illegible]rogress in raising student achievement.

There are those who woul[illegible]d protest most all uses of standardized achi[illegible]evement tests when important consequences [illegible]are attached to the results. But when used pro[illegible]perly, the right tests can be an important ele[illegible]ment in raising student achievement. In a rec[illegible]ent report, the National Research Council pu[illegible]t it this way:

> *When tests are used in u[illegible]ays that meet relevant psychometric, legal, [illegible]nd educational standards, students' scores pr[illegible]vide important information that, combined [illegible]ith information from other sources, can lead [illegible]to decisions that promote learning and equalit[illegible] of opportunity.*[1]

There are many considerations involved in the use of standardized tests. The points discussed below have to do with two principal aspects. One is that we are using tests to hold students and schools accountable for standards before building much needed teaching capacity. The other is that tests that measure student achievement are being misused. Of course, whole books and thick reports are written about tests and their uses. We will confine this discussion to several important ways testing can go astray through inappropriate use. We need to heed the warning in the National Research Council report, cited above: "When test use is inappropriate... It can undermine the quality of education and the equality of opportunity."

ALIGNING TESTS TO CURRICULUM

Students should be tested for what they are taught; that is, tests should be aligned to curriculum. The standards-based reform movement that began in the 1980s contemplated a process that would set challenging content standards based on broad agreement as to what students should know and be able to do. Next, performance standards were to

[1] Heubert, J. P., & Hauser, R. M. (eds.). (1999). *High Stakes: Testing for Tracking, Promotion, and Graduation,* (National Research Council Report). Washington, DC: National Academy Press.

be set to determine how much of this content students should be held accountable for mastering. Finally, after content standards had been translated into curriculum actually in use in the classroom, tests were to be developed to help determine whether students had learned what they were supposed to learn.

By now, all states have by and large established the content standards, although reviewers have judged them to be uneven in quality with regard to such things as how specific and rigorous they are. Next, most or many states jumped quickly into administering standardized tests on a large-scale basis, and established passing scores, often with federal help and prodding. But the intervening steps of changing curriculum, improving the teaching materials, and preparing teachers to deliver new curriculum were often skipped over, or at least not completed.

Despite skipping these vital steps, the results of these tests frequently have important consequences. They are placed on individual student records; they are used to judge the performance of schools and their teachers; and they are the bases for allocating resources; and sometimes for determining whether students pass, fail, go to summer school, or graduate. As far as the experts in educational measurement are concerned, this is an inappropriate use of tests; for those who are not experts, it simply defies common sense.

We are beginning to get information based on careful observation of what is happening in practice in some uses of large-scale testing. A recent study issued by the Council of Chief State School Officers, entitled *Alignment of Science and Mathematics Standards in Four States*,[2] found that "alignment between assessments and standards varied across grade levels, content areas, and states without any discernible pattern." The Council also has underway an 11-state study called the *Survey of the Enacted Curriculum*, which is being carried out in collaboration with the Wisconsin Center for Education Research. A recently issued summary of this project concluded that, "even where widely disseminated and used by teachers, standards do not provide curricula for teaching in classrooms."[3] In eight of the states studied, the survey found that in fourth-grade mathematics and eighth-grade science, "less than half the intersections of content topics [being taught in the classroom]... were in common with the assessment items found on the state test."

In other words, we see tests not aligned to the standards, and tests not aligned to the curriculum. When students and parents see tests that do not reflect what is being taught, they lose confidence in the reform movement. The testing results tell as much about the incompleteness of implementing standards-based reform as they do student, teacher, and school performance.

[2] Webb, N. L. (2000).
[3] May 2000. Council of Chief State School Officers.

Using Multiple Criteria for High-Stakes Decisions

When making important decisions about students, teachers, and schools, good tests used appropriately may help, but standardized tests should never be the sole basis for such decisions. This is one matter that experts in the testing business agree on, whether those experts are reputable testing companies, educational measurement professionals, or researchers in the area of testing and psychometrics. Standards for test use issued by the American Psychological Association, the American Educational Research Association, and others frown on such a practice. A 1999 report issued by the National Academy of Science,[4] had this to say: "No single instrument can serve all purposes well. Assessment should involve a range of strategies appropriate for inferences relevant to individual students, classrooms, schools, districts, and states." The National Research Council report, cited earlier, gives this admonition:

> *A test score, like other sources of information, is not exact. It is an estimate of the student's understanding or mastery at a particular time. Therefore, high-stakes educational decisions should not be made solely or automatically on the basis of a single test score but should also take other relevant information into account.*

It is understandable that many would want to rely exclusively on test scores. There is a desire for criteria external to the classroom — to show objectivity when important decisions are made. Test scores are relatively inexpensive. And they provide a specific number, which gives an aura of precision. But people who know that a single number is not an adequate basis for such decisions stress that human judgment is still required. Other criteria are also important, such as teacher judgment, grades, homework, classroom participation, and tests given by teachers. If we ignore the professional judgments of teachers, we send a message to those who teach, and those who might want to be teachers, that their judgments are not valued or trusted. Good judgment in the classroom will decline, not increase.

If standardized tests are to be used to judge schools, they must measure the gain in knowledge during a school year, not the abilities and knowledge acquired during a lifetime. The tests we now use, with only a few exceptions, measure what students know and can do at a point in time. If it is a math test at the end of the eighth grade, it captures what the student has learned in the prior seven grades, in the family, and in the community. What's more, it reflects the student's cognitive development — the result of nutrition and intellectual stimulation provided generally in the early childhood period. How do we identify

[4] Elmore, R., & Rothman, R. (eds.). (1999). *Testing, Teaching, and Learning: A Guide for States and School Districts.* Washington, DC: National Academy of Science.

the addition to knowledge a school achieved *during* the eighth grade? And if we look at test scores of a school's eighth graders over 10 years, how do we factor in how much of the change, up or down, is due to changing demographics of the student body and how much is due to what the school did?

Data from the National Assessment of Educational Progress (NAEP) illustrate what a test of *gain* in knowledge — as opposed to a test of *level* of knowledge — can tell us about schools. In 1992 and 1996, of the 37 states taking the assessment in both years, Maine had the highest fourth- and eighth-grade NAEP scores in mathematics, and Arkansas had the lowest. However, the gain in these NAEP scores — from 1992 when the students were in the fourth grade to 1996 when the students were in the eighth grade — was 52 scale points in both Maine and Arkansas. Arkansas, of course, is one of the poorest states in the nation in terms of per capita income. Yet, the schools in Arkansas added as much math knowledge in those four years as did Maine. In terms of state testing, only Tennessee currently uses such a gain-score testing system, and William Sanders has pioneered the development and use of these value-added measures.[5]

It isn't either/or in testing; we need to know both. The test of total knowledge tells how society as a whole is doing in youth development; the test of gain in knowledge, from the beginning to the end of the year, gets closer to revealing how well schools do in adding knowledge. From a technical standpoint, measuring gain has its own set of difficulties, which need to be overcome.

The large-scale use of standardized testing has become a mainstay of education reform efforts in the United States, and in holding schools accountable for results. If education reform will stand or fall on how well we use standardized testing, we better take a close look at what we are doing and get it right. It's a matter of achieving success, and of being fair to students, parents, teachers, and the education enterprise generally.

We argue here for putting standards-based reform back on the track it started on. But even if we do, the reform movement can succeed only if policymakers and educators pay attention to the larger societal context and environment in which change is to be implemented. This larger context is addressed in the next sections of this report.

[5] This analysis is provided in *Growth in School*, by Paul Barton and Richard Coley, published by Educational Testing Service in 1998.

Student Behavior: Standards to Increase Achievement

For several years now, the focus of attention on student behavior has been on instances of extreme violence.

As important as this is, and as correct as parents and students are to be concerned, these are relatively rare events; 99 percent of all homicides involving children happen away from school.

What is not rare, is in fact widespread and is growing — not declining — is student behavior that is disruptive to the learning environment of the school and of the classroom. This situation has attracted almost no national attention, other than the campaign of the American Federation of Teachers begun by the late Albert Shanker, and is not addressed in the standards-based reform movement. But ask any teacher and you will be told how much order and discipline matter to learning.

The Behaviors

School behavior problems are not uniform across states, and they vary as well among children from different socioeconomic classes. Exposure to learning disruption also falls unequally by race and ethnic group. The kinds of behavior that are problematic vary highly, from fighting, to verbal abuse of teachers, to cutting classes. Problem behaviors tend to fall into two categories: those like cutting classes, that impact the achievement of the student practicing the behavior, and those that impact the climate of the entire classroom or school, and thus the achievement of all students.

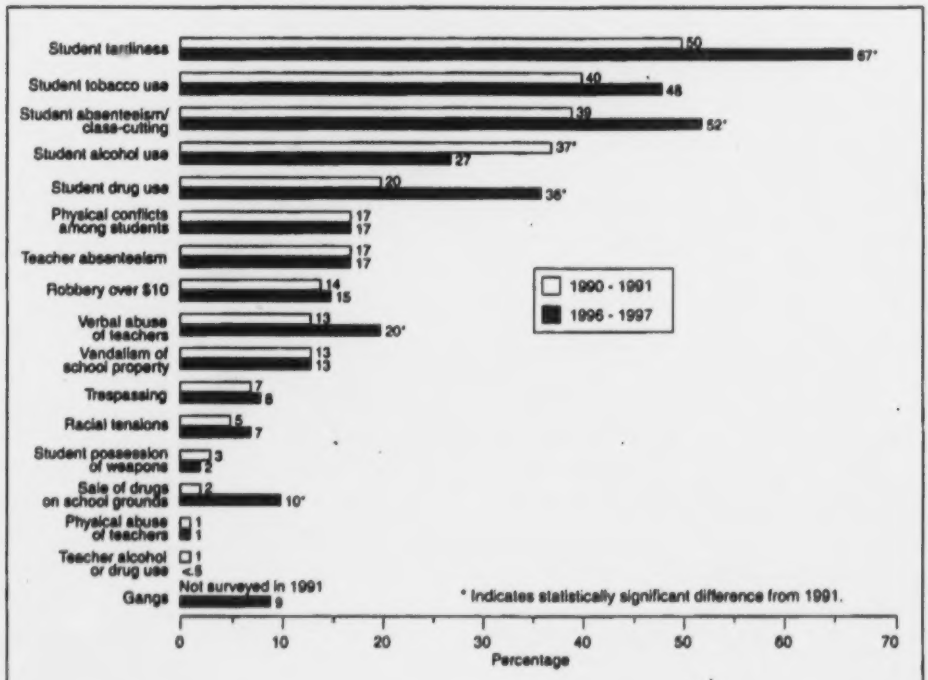
While nationally, just 14 percent of eighth graders said, in 1996, that physical conflicts were moderate or serious problems in their schools, the percentage was higher in individual states: 44 percent in Hawaii, 38 percent in Maryland, and 35 percent in Georgia. According to data from the NAEP mathematics assessment, just nine percent of students felt unsafe or very unsafe in the nation's schools as a whole in 1996, but 20 percent of students in the District of Columbia, and 14 percent in Mississippi, South Carolina, and Florida, felt this way. Fewer students, just five percent, felt unsafe in North Dakota.

As Figure 1 demonstrates, trends tracking problem behaviors from 1991 to 1997 are generally unfavorable. While there was a decline in alcohol use during this period, and no statistically significant changes were reported for some discipline issues, behaviors that worsened[6] were;

- tardiness
- absenteeism or cutting classes
- drug use
- verbal abuse of teachers
- sale of drugs on school grounds

[6] That is, the change was statistically significant.

FIGURE 1: PERCENTAGE OF PUBLIC SCHOOL PRINCIPALS REPORTING THAT VARIOUS DISCIPLINE ISSUES WERE SERIOUS OR MODERATE PROBLEMS IN THEIR HIGH SCHOOLS, 1990-91 AND 1996-97



Source: *NCES*, 1998

For a slightly different time period, 1989 to 1995, we know that there was an increase in "violent victimization" of 12- to 19-year-old students from 3.4 to 4.2 percent.[7] The same group of students also reported an increase in the presence of street gangs in schools — 28 percent reported their presence in 1995, compared to 15 percent in 1989. However, for Black students the statistic rose from 20 to 35 percent, and for Hispanic students, from 32 to 50 percent. Gangs at school are becoming a widespread phenomenon in the United States, and their presence is being felt unequally.

[7] The U.S. Department of Justice's School Crime Supplement, 1989 and 1995.

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It Matters

Some of these behaviors have obvious impacts on teaching and learning. Class cutting, absenteeism, and tardiness reduce learning time. Drugs and alcohol are a drag on health, on studying, on attention, and on attendance. Physical conflict and the presence of gangs cause fear in going to and from school and at the school itself. And that fear is rising. In 1989, six percent of all 12- to 19-year-old students feared attack or harm at school, and four percent were afraid while going to and from school. By 1995, those figures had risen to nine and seven percent, respectively. The proportion who fear harm at school is higher for Black students: one in six Black students felt fear in suburban schools.[8] Fear and learning are not good companions.

As a matter of science, though, little has been done to enable us to say precisely which behaviors harm achievement, or how much. An ambitious 1978 study measured problem behaviors, but not achievement. Recently, Harold Wenglinsky of Educational Testing Service (ETS®) analyzed the results of a study begun in 1988 called the National Education Longitudinal Study. Using that study's achievement test in combination with information regarding student behaviors elicited by questionnaires answered by students, teachers, and parents, Wenglinsky found a relationship between student behaviors and achievement. He summarized the results this way:

> *The frequency of serious and nonserious offenses is negatively related to academic achievement in all four subject areas studied — mathematics, reading, science, and social studies... The frequency of drug offenses is negatively related to academic achievement in mathematics and science, but not in social studies and reading.*[9]

Another likely impact of growing disruption in the school environment is its effect on the supply of people willing to enter and continue in the teaching profession. Many problem behaviors are directed toward teachers. A review of what research exists on this relationship led this author to conclude, in a book recently published by The Century Fund, that discipline does make a difference in teachers leaving.[10]

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[8] Kaufman, P., Chen, X., Choy, S. P., Chandler, K. A., Chapman, C. D., Rand, M. R. & Ringel, C. (1998). *Indicators of School Crime and Safety*, 1998 (NCES 98-251/NCJ-172215). Washington, DC: U.S. Department of Education and Justice

[9] Barton, P., Coley, R. & Wenglinsky, H. (1998). *Order in the Classroom: Violence, Discipline, and Student Achievement* (ETS Policy Information Report). Princeton: NJ: Educational Testing Service.

[10] *A Nation at Risk: Preserving Public Education as an Engine for Social Mobility*, in a chapter by this author titled "Unequal Learning Environments: Discipline That Works," edited by Richard Kahlenberg and commissioned and published by The Century Fund (formerly the 20th Century Fund) in September of 2000.

A Variety of Approaches

In the last couple of decades, a variety of serious attempts to improve stude[nt behaviors] have been directed at the more s[erious prob]lems of bringing weapons to scho[ol, at aggres]sive behaviors more generally, and [at more gar]den variety forms of disorder and [disruption.] Some of these efforts involved ev[aluations of] their effectiveness, conducted w[ith varying] degrees of rigor, and with gener[ally positive] results. Others used "before and [after" com]parisons, or anecdotal evidence [of improve]ment, to measure their success. [A review of] these practices, as well as the res[ults of those] evaluations that exist, are provided [in the Cen]tury Fund book, referenced abo[ve. *Order in*] *the Classroom*, also previously cite[d,] study of trends in behaviors ar[presents a] approaches to modifying them. [different]

Student behaviors that reduc[e the effec]tiveness of teaching and impact st[udent learn]ing do not have to be accepted a[s inevitable.] However, to reduce the inciden[ce of these] behaviors, choices must be made a[mong a wide] variety of approaches for which so[d scientific] evidence of effectiveness is not a[ways avail]able (much like the case in the edu[cation field] generally). Experience must be com[bined with] good judgment. Likely, the best so[lution is not] a simple matter of using a single ap[proach, but] the combination that works best [and fits best] with the culture of the school and c[ommunity.] Examples of these approaches inc[lude:]

- *Statewide "zero tolerance" legislation*, as in West Virginia and Texas.
- *Alternative schools*. Expelling students is a more frequent means of enforcing zero tolerance policies. However, there are not enough of these "alternative schools" to accommodate the students who need them.
- *New district level "code of behavior,"* as in Cincinnati, Ohio.
- *New disciplinary authority* for teachers in collective bargaining contracts, as in Minneapolis, Minnesota.
- *Character education*, now supported with Federal grants and undergoing evaluation in each state receiving those grants.
- *Teaching conflict resolution*, as in the Dayton, Ohio program called the "Positive Adolescent Choices Training Program."
- *Strict school security measures*, such as metal detectors, restricted school entry, "closed campuses" that restrict students from leaving school, and the presence of law enforcement personnel in schools. (Such approaches were surveyed in 1997 by the National Center for Education Statistics.)
- *Classroom management systems*, such as one called "Consistency Management and Cooperative Discipline."

There is, of course, an interaction between student behavior and the academic environment. The brief review provided above considers how improving student behavior can improve teaching and learning. It is likewise true that good teaching and

more challenging subject matter can improve student behavior and classroom discipline. It is a two-way street, and we must go down both sides of it. Standards of behavior are a vital part of standards-based reform, and reports of behaviors must be viewed against those standards. In some states, student behaviors *are* factored into accountability systems, and measures of school climate are presented on school report cards. It may be such accountability that forces us to find ways to improve student behaviors and the learning climate in the school and classroom.

Weak Signals That Academic Achievement is Important

The quality of education is at the top of the list of what concerns Americans these days, particularly when it comes to electing public officials.

But when it comes down to the signals the individual student receives from his or her environment, how high is the country's goal for student learning? That is the question. True, teachers and schools share a responsibility to create the desire to learn by presenting challenging subject matter in the classroom and by using teaching skills to stimulate interest. But this is not the only source of student motivation by far. Motivation comes from a myriad of messages a student receives — in the family, in the community, on the job, and in the culture — from the portrayal of learning in sitcoms to the ways students gain social acceptance from their peers. The hard fact is that American culture is not really a learning culture, at least not in the K-12 period of life.

Signals From Parents

Recognizing, of course, that there is a lot of variation among individuals from the same life circumstances, the shaping of the motivation to excel in school comes from the immediate family and environment during childhood. Generally, striving in school has a lot to do with the signals young children receive. I would argue that the "typical" American family wants to raise a fairly "typical" American child — one who is popular with playmates and has a lot of interests and activities. Yes, do your homework, but concern will develop if the parent thinks that the teacher is loading too much on the child. If the math grades are a little low, it may well prompt a remark that math was hard for me also. Parents have a larger agenda for their children than studying: In a pubic opinion poll conducted by Gallup for Phi Delta Kappa International in June of 2000 (*The Washington Times*, August 23, 2000), 42 percent of parents said that school extracurricular activities are as important as academic studies. Parents, though, put great emphasis on getting a high school diploma; the diploma itself is often valued more than academic achievement.

Developing student interest in learning is critical. In the Third International Mathematics and Science Study (TIMSS), 51 percent of American eighth-grade math teachers said that having "uninterested students" limited their teaching "quite a lot" or "a great deal." That's just the teacher's perspective, of course, but the percentages were lower in Germany (43 percent) and Japan (37 percent).

Yes, improving education seems to be a hot political issue. Real estate agents will tell you that schools are a key consideration when people pick out their houses. But the Gallup poll director speaking in Phi Delta Kappa International said:

The notion the public is dissatisfied with its public schools is based on myth instead of fact... The data indicate that public approval of the public schools has trended consistently upward and is near its all-time high... And as demonstrated in every previous poll, the closer people get to the public schools [in their neighborhoods], the better they like them.

While there is a demand for better school quality nationally, parents are likely to get up in arms if they see too much changing in their schools — especially if those changes upset the pattern of education they experienced and are used to. Thus, if we are to see much movement upward in academic achievement, it is critical that *families* come to believe that their schools must raise their academic standards and that *their* children must do much better academically.

Signals From Peers

Students feel as though they are being asked to commit an unnatural act if they are expected to strive for a goal not appreciated by their peers. Striving too much, or too obviously, may actually cause them to be less popular with their peers. They are often less than admired if they study too much. If they have a strong bent in a particular academic area, they may be thought of as geeks, particularly if they want to talk about this instead of the current movie in town. If they are both academic achievers and not terribly apt socially, they may receive a worse label, nerds.

Students who do well in school, but without obvious effort, can be socially accepted; it's OK to be smart. On the other hand, parents can sometimes be heard apologizing for a daughter's success: "Well, yes, but she has to work hard for it." The value placed on hard work varies with individuals and families, and with the cultures that frequently accompany race and ethnicity. For example, Asian Americans have a reputation for placing a high value on academic achievement. And according to the scholarly literature, Black youth are often accused of "acting White" when they work hard.

Signals From Colleges

Given that there is a high value placed on going to college in the United States and colleges have entry requirements, college must provide some incentive to do well in academics, at least during high school when students and families realize the time for college is looming. But, looking at the nation as a whole, the incentive to excel in school is not delivered strongly from the admissions requirements of the postsecondary system. True, for selective colleges, doing well is necessary for admission. But it is also true that only one in four 25- to 29-year-olds has earned a bachelor's degree, a proportion that has been a constant over most of the last quarter of a century, moving up a few percentage points only over the last two or three years. And it is also true that the vast majority of postsecondary institutions are not selective, or not very selective. How well you do in high school may determine *where* you can go to college, but it seldom determines

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whether you can go. Didn't learn the basics of good English and math in school? Well, three out of 10 college freshmen take remedial courses to prepare for *real* college courses.

Signals From Employers

How about the incentive to excel in school in order to get a better paying job? It is a frequently heard message in the United States that how far you go in education determines how well you do in the employment world. The facts clearly support such statements. In the workforce, each advance in level of education is accompanied, on average, with an advance in success in the labor market (as measured by lower unemployment and higher pay).

Unfortunately, there is a period from age 17 or 18 until well into the 20s when this does not hold up. This finding is so counterintuitive, and counter to conventional wisdom, it is hard for many people to accept as true. Employers who offer what I call adult-type work, with good pay and fringe benefits, are generally loath to hire young people just out of high school, preferring to wait until they are well into their 20s — their perception of the age of maturity. Employers who do hire young people at age 17, 18, or 19, hire them for "youth jobs," all of which pay about the same and do not require much education. In actuality, the employment prospects of high school graduates with above average grades and test scores are no better, at these ages, than those with lower grades and test scores; high school dropouts do as well as high school graduates. But as these young people advance into their late 20s, the situation begins to change, and those who excel in school begin doing better. Employers do value a high school diploma.

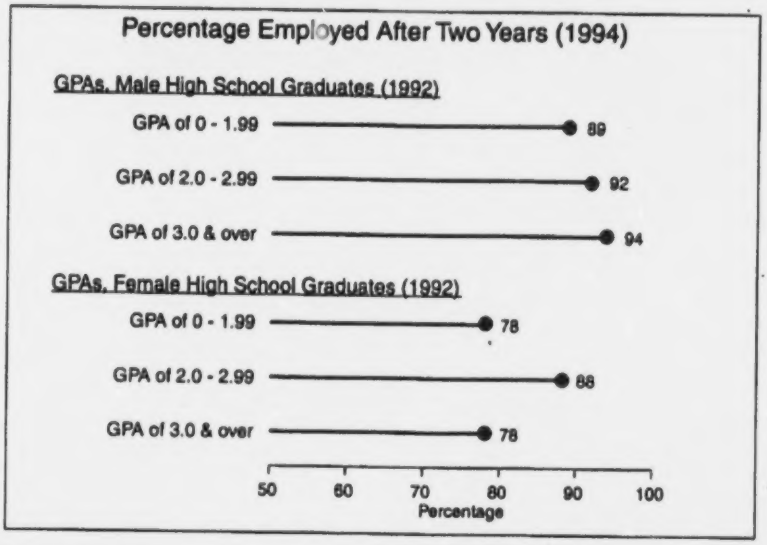
The summer 1999 issue of *ETS Policy Notes*[11] examines the labor market experience of youths leaving high school. Figure 2 demonstrates the difference grades make two years out of high school in terms of employment and earnings, and the data show very little difference in terms of the percent of young people employed, and no statistically significant differences in terms of average monthly earnings. A national database linking test scores and labor market success from age 19 to age 31 also shows little difference in these early years, but it shows that the higher performers begin to pull ahead at about age 23.

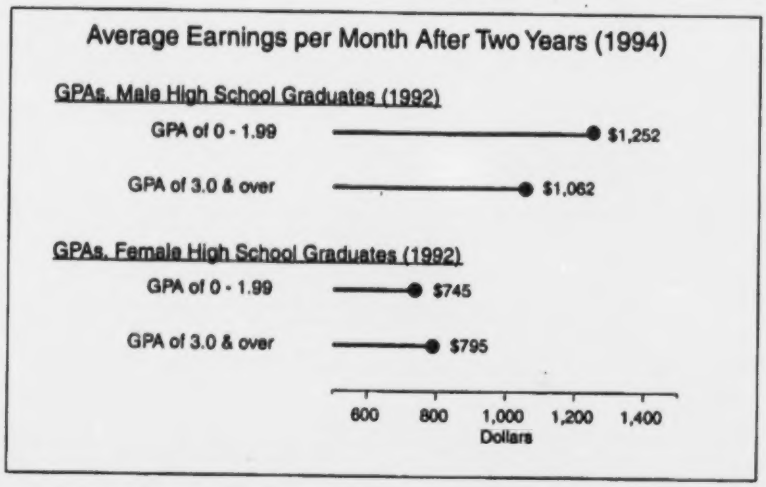
The message for young people is that performance in school does make a difference, but they may not see it for a while. Their academic performance will also determine their college chances, and college will give them better opportunities. But it is likely a hard message to get across when high school students see what happens in the short term to those who graduate. They know that, by and large, employers do not ask to see school transcripts.[12] The incentive to achieve in high school based on employment success is not apparent enough to young people with short time perspectives.

[11] *ETS Policy Notes.* (1999). "Learn More, Earn More?" Princeton, NJ: Educational Testing Service.

[12] More are, though, through recent efforts of a business coalition led by the National Alliance of Business.

FIGURE 2: THE DIFFERENCE GRADES MAKE: EMPLOYMENT AND EARNINGS OF MALE AND FEMALE 1992 HIGH SCHOOL GRADUATES (NOT ENROLLED IN SCHOOL) TWO YEARS AFTER HIGH SCHOOL (1994), BY GRADE POINT AVERAGE





Source: NELS:88 Data (National Center for Education Statistics), calculated by the ETS Policy Information Center.

Strong signals to achieve are necessary if we are to raise academic achievement in public schools. The signals young people get and respond to come from parents, peers, teachers, counselors, colleges, and employers. Teachers, who want the best for their students and are being pushed by standards-based reform and accountability efforts to raise student achievement, deliver strong messages to try hard. But schools are not getting a lot of help from the other players in students' lives. They will not get far if they have to go it alone.

It is true that opinion polls put education at the top of the list of public concerns, at least in terms of what people want from political leaders. But little of this demand translates effectively into improving the quality of classroom teaching, paying teachers professional wages, or advancing the professional development of the existing teaching force. A strong signal from the public that education really does matter would be to take the steps necessary to improve teaching and learning.

A *Learning* Policy Recognizes Sources of Lear ning Outside the School

to raise educational achieven ent, and there is widespread agreement that we are generally on the right track in the standard-based reform movement.

I am in total agreement with b oth opinions. But what has emerged alon the road to achieving reform is a reluctan e to examine all of those factors that dete mine student achievement. Our focus is on a cademic standards in schools. And although this is, in part, as it should be, we must also wo k on a broader front if we are to raise educa ional achievement significantly. This inclu des important factors beyond school doors.

To a considerable extent, our reluctance to address important nonac demic factors stems from a fear that to con ider such factors may cause us to lose focu , and that recognition of these factors may p rovide excuses for not raising standards and a hievement. In fact, it is becoming popular to s y "no excuses" — heading teachers, schools, a nd others who examine such things off at the pass. We tend to put considerations of famil , community, and economy off-limits in ed cation-reform policy discussions. However, v e do so at our peril. The seriousness of our p rpose requires that we learn to rub our belli s and pat our heads at the same time.

The research on the rol these factors outside the school play is clear enough, although it tends to be expres ed in research-ese. No matter: Plain commo n sense tells us that if parents are important, two are better than one; if young children a e not exposed to reading, they will not le rn to read; if children are not well nourish d and kept in good health, the development of their minds will be held back; rich parents have more resources than poor parents; caring neighbors and a sense of community create a positive environment for children to grow up in; and parents who involve themselves in their children's schools and education contribute to student learning.

One way we have examined the role of nonschool factors in student achievement has been through the relationship between socioeconomic status (family income and parent occupations) and school success. The first large-scale study of this relationship — the now famous Coleman Report, commissioned by the Federal Government and published in 1966 — showed that variations in student socioeconomic status was by far the largest explanation for variations in student test scores. This nonschool factor explained much more of these differences than did school factors. The Coleman data has been analyzed and re-analyzed. Subsequently, many other studies have confirmed the strength of such factors in correlations with student test scores. In other writing and research, James Coleman used the concept of "social capital" (defined by David Grissmer, below) to describe the role of socioeconomic status in student achievement, independent of what happens in the schoolroom.

It is, of course, not family income or what the parent does at work all day that affects student learning. This gross construct, socioeconomic status, has not been decomposed

into those specific things that do affect student learning, the totality of which is also evidently correlated with student achievement. We could, of course, pursue a policy of reducing this wide spread in family income in the United States, and in doing so we could expect to narrow the difference in student achievement. But while we are a nation committed to equality of opportunity, we are not committed to equalizing family income. In fact, income has become more unequal in the past few decades (and is also more unequal than in other developed countries). To better inform a learning policy, we need to identify more specifically those factors that affect student development, and separate those that we can do something about in specific efforts from those that are more dependent on larger societal change.

Experience in one area reassures us that we can improve learning outcomes with preschool interventions. The Head Start program of the 1960s has been found effective in evaluations over several decades. There is strong circumstantial evidence that it was the investment in Head Start and other preschool programs in the 1960s that reduced the gap in scores between White and minority students in the 1980s.[13]

The matter of "family factors" in student achievement was explored in 1992 in a report issued by the ETS Policy Information Center.[14] The report identified family factors from the 1990 NAEP assessments and related them to achievement scores. For example, Figure 3 shows, state by state, the percentage of eighth graders with three or more types of reading materials in the home, which varies from 90 percent in North Dakota to 68 percent in California. The figure also shows students' average NAEP score in mathematics for each state. North Dakota is at the top in math achievement and Louisiana is at the bottom.[15]

In the Summer 1993 issue of *ETS Policy Notes*,[16] the five family factors most strongly related to achievement were identified. The positive factors were having two parents in the home, reading more than two pages a day for school and homework, and having at least three types of reading materials in the home. The negative factors were student absenteeism and excessive television watching. This report showed that 91 percent of the differences among the states in test scores were associated with these five factors, considered together. Figure 4 shows how actual state NAEP scores compare with scores that would be expected based on the five factors listed above. We see that some higher-scoring states, like New Hampshire and Wyoming, did less well than expected based on these family factors, and that some lower-scoring southern states, such as Texas and Florida, did better than expected.

In 2000, David Grissmer developed measures of family and social capital and applied them to state NAEP achievement scores.[17] By

[13] An early analysis of this can be found in *The Reading Report Card*, 1985, Educational Testing Service.

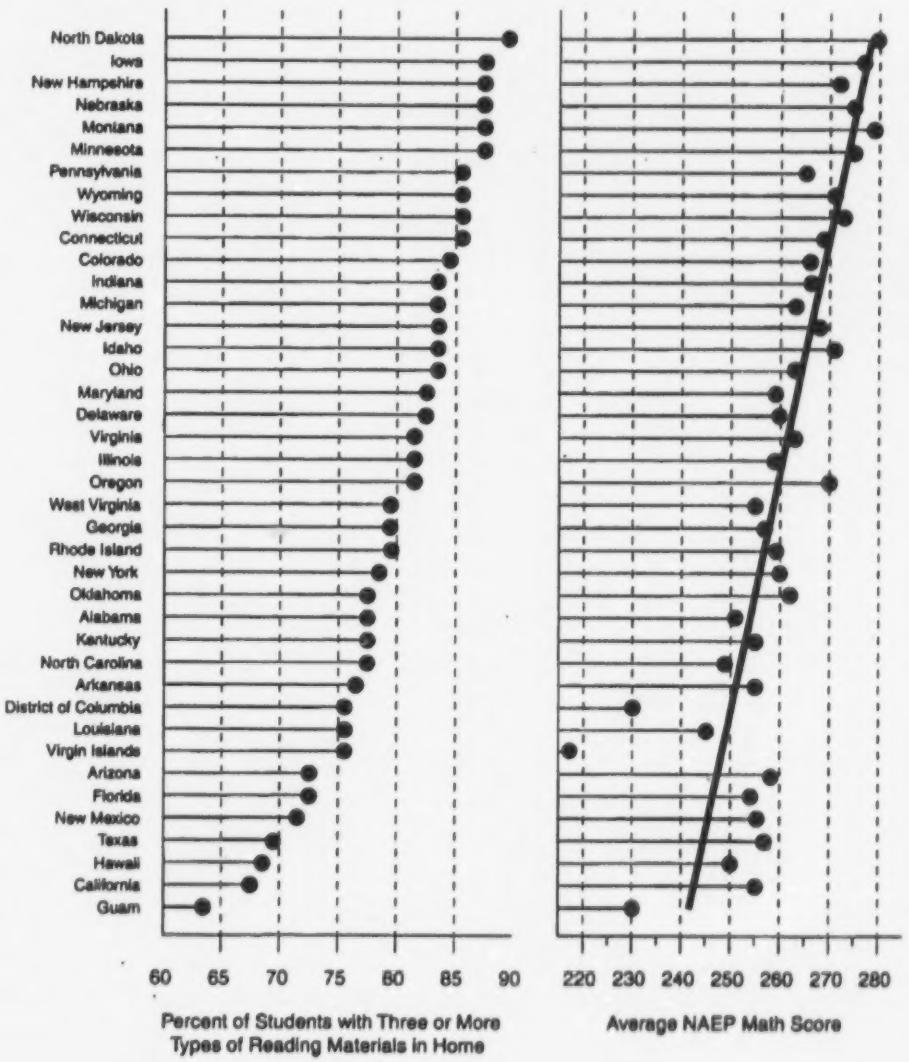
[14] Barton, P. & Coley, R. (1992). *America's Smallest School: The Family* (ETS Policy Information Report). Princeton, NJ: Educational Testing Service.

[15] The line (on the right hand side) that runs down the middle of the score chart shows how close the relationship is between the number of reading materials in the home and NAEP scores.

[16] *ETS Policy Notes*. (1993). "Angles on Math Achievement." Princeton, NJ: Educational Testing Service.

[17] See Improving Student Achievement, What State NAEP Scores Tell Us, Rand.

FIGURE 3: THE PERCENTAGE OF EIGHTH GRADERS WITH THREE OR MORE TYPES OF READING MATERIALS IN THE HOME AND NAEP MATH PROFICIENCY, 1990



Source: *America's Smallest School: The Family.* (1992). (ETS Policy Information Report). Princeton, NJ: Educational Testing Service.

FIGURE 4: ACTUAL AND PREDICTED NAEP MATHEMATICS SCORE BY STATE, 1990 (PREDICTION BASED ON SCHOOL ABSENCE, TV WATCHING, READING AT HOME, READING MATERIALS IN HOME, AND PRESENCE OF TWO PARENTS IN THE HOME)

Source: Data are drawn from Ina V.S. Mullis et al. *The State of Mathematics Achievement*, National Center for Education Statistics, Educational Testing Service, June 1991.

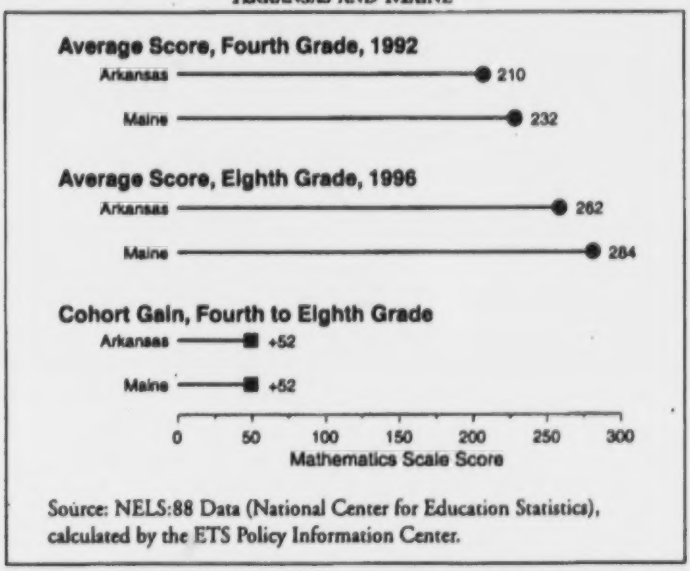
family capital, Grissmer means "the characteristics within families that create higher achievement;" social capital refers to influences on achievement "through such things as peer effects, quality of communication and trust among families in communities, the safety of neighborhoods, and the presence of community institutions that support achievement." Using raw NAEP scores, Grissmer asks and answers two questions: How much do these scores differ on an absolute basis, and then, how much do they differ among students from families that are similar in terms of family and social capital. The actual variables used by Grissmer were parental educational levels, family income, race and ethnicity, family type, family mobility, and two measures of socioeconomic status. Using the raw NAEP scores, there was considerable variation among the states: "The average scores in the highest ranked state would be approximately between the 62nd and 67th percentile nationally, while average scores from the lowest state would be around the 33rd to 38th percentile. This represents a significant variation in test scores among students from different states."

However, when he controlled for family and social capital characteristics, this difference in test scores shrunk tremendously. In the estimates of score differences for students from similar families, there is a difference from top to bottom of only 11 or 12 national percentile points. Who is near the top and who is near the bottom shifts considerably, as was the case in the ETS comparison of actual and predicted NAEP scores based on family resources and practices (Figure 4). Some well-off northern states near the top in the raw scores ended up much lower down in the adjusted ranking, and some southern states near the bottom ended up nearer the top. In terms of average state scores, the differences that various school approaches made were much less significant than differences due to family and social capital. These latter variables accounted for 75 percent of the differences in test scores. However, the Grissmer study also identifies education policies and practices that do matter.

In the ETS Policy Information Report, *Growth in School*, cited earlier, NAEP data are presented based on growth in scores of cohorts of students from the fourth to the eighth grade, and trends in these cohort scores are compared to trends based on levels of knowledge of fourth and eighth graders. Across about two and a half decades, *level* of knowledge rose in three out of four subjects, but did not rise in any of the four in terms of the cohorts, or in the *growth* in knowledge over four years of schooling. Therefore, the improvement stemmed from what was happening *before* the students took the NAEP assessment in the fourth grade, and likely from changes happening outside of school before they entered the first grade.

Another example of this difference between level and growth is shown in Figure 5. As noted earlier, of the 37 states participating in NAEP in both 1992 and 1996, Maine had the highest math scores and Arkansas had the lowest. But in terms of growth, the students in both states improved by 52 scale points. Arkansas is a poor state, but its

FIGURE 5: AVERAGE NAEP MATHEMATICS SCORES AND COHORT GROWTH, ARKANSAS AND MAINE



Source: NELS:88 Data (National Center for Education Statistics), calculated by the ETS Policy Information Center.

students grew as much, over their earlier scores, as students in Maine. We ask, do schools in Maine do a better job in teaching mathematics from fourth grade to eighth grade than do schools in Arkansas? Further, can we raise student achievement significantly by dealing with the nonschool factors involved?

We need a better means of tracking where changes in educational achievement are coming from. We need to face the hard fact that improving educational achievement means attending to what happens in American families and the effects of our social capital. Without doubt, in the last several decades since NAEP started providing measures of educational progress, schools have faced an uphill battle in terms of trends in social capital. This period coincides with what Francis Fukuyama called *The Great Disruption* in a book by that name. He concluded that "beginning in about 1965, a large number of indicators that can serve as negative measures of social capital all started moving upward rapidly and at the same time."[18]

The purpose of measurement is to help us find those pressure points at which we can fashion efforts to improve student achievement — including those that occur early in life and in spheres outside the school. On the bright side, significant efforts are being made in some areas, and federal and state support for early childhood and early literacy programs has grown. But education achievement indicators have hardly begun to budge. The socioeconomic status of young children remains as strong as ever a predictor of their relative achievement in American society.

[18] Fukuyama, F. (2000). *The Great Disruption*. New York, NY: Simon & Shuster.

Dumb Computers and Smart People

In a somewhat different category is the matter of the use of computers in the classroom.

Schools have not ignored technology. Computer use is becoming pervasive, and many look to this advancement as a magic bullet. But what has not been grasped is how much more we have to do. The hard fact here is how much more we must invest in *people* and in the educational content that gets put into the machines.

This story begins in the 1930s, and it would be fascinating to know where it will end. Konrad Zuse is credited with being the first to use the binary system in the creation of a computer in Nazi Germany in 1935 and 1936; he was perhaps the first to have the idea of doing so. Yet, even as computers do ever more amazing things, it remains a fact that all they can really do is distinguish between 0 and 1 — albeit with ever increasing speed. In this sense, the computer is a dumb machine, one that can be made by human intelligence to perform remarkable tasks. That said, dumb machine or not, the ability of Colossus to break the German codes created by ENIGMA received a lot of credit in the winning of World War II, and computers continue to be made to do things that amaze us.

The real possibilities of computers in the classroom may have been imagined by a number of the early creators of computers, but they were put in writing in a prophetic way by Christopher Evans in 1979.[19] He said, "In schools, computer teaching — initially for 'drill and practice' — will begin to spread as costs spiral downwards." Schools were indeed early users of computers, and at some point they began arriving at schools in truckloads as some combination of lower costs, obsolescence, and tax laws resulted in massive donations from computer makers. To a considerable extent they were still pretty dumb machines, lacking the software brains that would enable them to deliver useful instruction.

And used for drill and practice they were, just as had been delivered earlier by various versions of programmed learning. Drill and practice is still a principal use of computers in terms of instruction, as is using word processing programs to write. According to a recent assessment by Larry Cuban, professor of education at Stanford University, "When the type of classroom use is examined, we find that these powerful technologies end up being used most often for word processing and low-end applications. And this is after a decade of increases in access to computers, Internet capability, and purchases of software." There are, to be sure, a variety of creative instructional uses now employed in many classrooms, and schools are making investments in software. One step forward is that we can now track these developments in *Education Week's* yearly issue of *Technology Counts*.

[19] Evans, C. (1979). *The Micro Millennium*. New York, NY: First Washington Square Press.

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There is little doubt that th computer can be a useful tool for educatio The ques-tions before us now are *how* useful, for exactly what purposes, and what is their role in relation to human teachers. Often, the debate about appropriate roles an uses is just part of the general debate abo ut effective instructional strategies and peda ogies. How much "drill and practice" should there be — whether delivered through raditional means or through a computer? How much "constructivism" should there b in instruc-tional approaches — whether it struction is from the teacher or the compu er? Increas-ingly, it seems computers can d most any-thing software designers want hem to do, except supply the human eleme that is rec-ognizably important for the m otivation to learn. Each remarkable use, such as Big Blue beating Karpov, reinforces the vi w that they can one day serve well in the cla sroom.

The extent of the belief th computers can be made to deliver instruct on is appar-ent in the conclusion that the hi hly regarded Howard Gardner has come to: he ultimate in approaches is one tutor to one student, and the computer can be used to deli er individu-alized instruction. He puts it th s way:

> *For the first time in human hi tory, it is easy to envision a mass educational environment where instruction can be tru individual. Computers can be programme so that they present information and intera tions that are appropriate for each student; moreover, as 'intelligent systems,' they can record approaches that have worked m ore or less well for a particular student, and readjust the curriculum and assessments accordingly.*

Gardner is quick to point out, however, that the human teacher is not replaceable. "Human beings learn, and want to learn, because they want to be like individuals they admire, who care for them, and for whom they care," he states. The computer does not replace the teacher on the other end of the log, but a computer can be a huge help by providing access to a tutorial.

The problem is not how smart the computer can be made to behave, but whether the human beings that form the system of schooling can be smart enough, and motivated enough, to figure out how to get students to use computers effectively, and how to create access to this resource on as routine a basis as we now have teachers in classrooms. How does such a problem get resolved within the professional, sociocultural, bureaucratic environment that exists within the larger governance system? How we will make decisions about computers is related to how we make other difficult decisions — such as how to anticipate, or not anticipate, a teacher shortage due to the baby boom echo; how to make salaries competitive enough to attract capable people; how to get good textbooks; or how to create safe and orderly learning environments. These are all things we don't do very well. If we can create the demand, and provide the resources, computer hardware and software systems seem to be in ready supply. But the hard fact is that we must achieve computer use in an institutional arrangement that has many difficulties in making such large transformations.

We have little scientific proof of what computers can accomplish in the classroom. Here again, judgments and deductions of various kinds are necessary. One large-scale study of mathematics achievement using the NAEP database found that using computers to teach higher order thinking skills, and providing professional development in classroom computer uses to teachers, results in higher student achievement scores.[20] Such evaluation will have an important role in the choices to be made.

Preparing Teachers to Use Computers in the Classroom

There is a huge challenge in preparing teachers to use computers in the classroom. Several different measurement efforts disclose inadequate preparation of teachers now in the workforce.

Schools of education now require instruction in technology. But *Education Week's 1999 Technology Counts* issue cites a number of people who tell us exactly what is going on in these schools. For example, Robert F. McNergney, president of the American Association of Colleges of Education, tells us that colleges are still failing to blend training on integrating technology into the curriculum. He says, "It's not happening. It's extremely difficult to wedge technology training into programs that are already packed." And, of course, these colleges are under pressure to improve instruction across the board. New competency-based standards for school certification by the National Council for Accreditation of Teacher Education address curriculum as a whole as well as technology.

The lack of preparation of teachers has ramifications beyond using technologies now in the classroom. The software teachers ask for, and the software they purchase, influence what the market supplies. While a lot of school buying is centralized, a lot is not. An *Education Week* survey found that while 23 states have group-purchasing programs, the general picture is one of teachers searching for software they think will help them teach; the initiative rests with individual teachers, and technology providers look to them to find out what they want and what will sell. Teacher development is not just preparing teachers for the technology now available; what becomes available depends on how much capability teachers possess.

As standards-based reform becomes ubiquitous, teachers increasingly find themselves up against the blackboard to deliver what is being measured on standardized tests. If the curriculum has actually been changed to reflect new content standards, teachers will need technology to help them deliver that curriculum; and if tests are aligned to the revised curriculum, then the technology — if teachers find it and use it — will help their students do well on tests. But in many states, content standards become little more than specifications for new tests; there is no systematic effort to change curriculum and

[20] Wenglinsky, H. (1998). *Does it Compute? The Relationship between Educational Technology and Student Achievement in Mathematics* (ETS Policy Information Report). Princeton: NJ: Educational Testing Service.

prepare teachers in its use. In such cases, teachers may well look for technology that is aligned with standardized tests, for that is where they will be judged.

We tend to discuss technology as a separate matter, not as one piece of the education puzzle. But what the discussion above shows is that there can be a disconnect between content standards, curriculum, technology, and tests. When this happens, technology may not be effective. Technology cannot make up for a standards-based reform effort that has fallen off track. Teachers might as well go back to the blackboard, an enduring technology.

More and more information is being collected about the availability and use of technology in the classroom — through surveys of the National Center for Education Statistics and private efforts, such as those of *Education Week* and the Milken Exchange on Education Technology. But a lot of key information is not available. We tend to count how many machines have been delivered to schools, and how many schools have been hooked up to the Internet. But we need to know more: How many of those computers are broken? How many are locked behind laboratory doors and seldom used? How are the Internet hook-ups being used in service of the curriculum? Perhaps we could devise some measure of computer-delivered instructional hours, and then move on to identifying what kind of instruction these hours are used for. Perhaps it will take NAEP to lead the way, as it has over the years in other areas.

There seem to be huge possibilities in harnessing technology to serve teaching and learning. Even with the nation's attention riveted on education, we seem to have extraordinary difficulty taking advantage of it. While clear and steady progress is being made, the realization of the power of computers remains, in the words of a Charles Shultz character, an "insurmountable opportunity."

Conclusion

This report summarizes a broad spectrum of research on forces that affect student achievement.

It draws on eight publications of the ETS Policy Information Center, as well as numerous other reports and sources. My concern has been to illuminate problems that are not being addressed, or have been addressed insufficiently, in the current education debate. I have attempted to glean from these many efforts and information sources those avenues to improving student achievement that are not being traveled — or at least not being given the emphasis they deserve — in the current education reform movement. In conclusion, I leave the following thoughts.

Standards-based reform is in danger of becoming simply a testing movement; testing itself is not the treatment, but a way of finding out whether new content standards, rigorous curriculum, and teacher preparation are producing results. In a full standards-based reform effort, testing is just one important component.

If there is no order in the classroom there will be no learning. Student behavior problems are getting worse, not better; in the 1990s, absenteeism, cutting classes, drug use, verbal abuse of teachers, and the presence of street gangs increased. While widespread attention has been given to murders at school, disruptive student behaviors have not been the focus of attention. Research shows that such behaviors do, in fact, adversely affect student achievement. There are, however, efforts in some places that can be emulated, and they are described in this report.

While educational improvement sits at the top of opinion polls, family, student peers, and society send weak signals to students that high achievement is important. More than two out of five parents think extracurricular activities are as important as academic studies; students fear that they will be less socially popular if they work hard in school; employers of high school graduates do not ask to see school transcripts; and many colleges have such low standards for admission that they routinely provide remedial courses.

The nation's focus has been largely on education policy and schools. But a *learning* policy that encompasses preschool development and draws on the resources of family and community is necessary to raise achievement. Research clearly shows that, in addition to school factors, family factors are important to learning. We need to better track sources of incentive for educational achievement and learning, whether in school or out. While significant efforts are being made in many places, we must elevate such efforts to the level of attention given high content and performance standards if we are to enlarge young peoples' capacities and advance achievement to the high level the public is demanding.

The great promise of computers is not near to being realized. While hardware is becoming widely available, we are not yet putting education content into these machines and we must invest in the preparation of teachers to perform the miracles these machines may well be capable of.

In identifying these areas where too little attention has been paid, I do not suggest that we lessen our efforts in implementing the standards-based reform agenda; it makes good and common sense to make instruction rigorous, set high standards, and develop quality standardized tests, the validity of which has been established for the purposes they are used. The quality of teacher preparation has drawn national attention, and important policy approaches are still being debated. However, drastic changes and considerable resources are needed, and there is little indication that the nation is prepared to do what needs to be done.

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